

LioN-Power DCU1

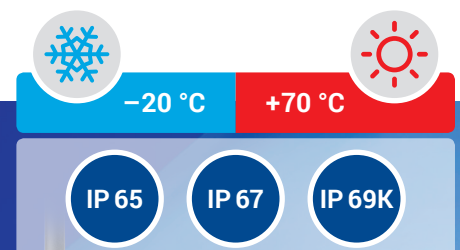
Industrial Distributed Control Unit

LioN-P DCU1 combines the benefits of a field-level (IP67) I/O module and a programmable logic controller (PLC) into one device for easy, customized performance of automation functions.

- +** **Improve overall automation security** through the DCU1's **integrated intelligence to ensure** control applications can run, **even if there is a PLC failure.**
- +** **Replace modules faster** by using the universal channels as digital input or digital output, without any configuration necessary. This flexibility **lowers module exchange time.**
- +** **Simplify machine transparency** by transforming fieldbus machines into Ethernet-ready devices that can work across a **variety of protocols.**

Key Features

- Internal cycle time of ca. 10 ms (minimum)
- Three operating modes – slave I/O, standalone DCU or mixed DCU/PLC
- Program memory of 99 rungs (maximum)/99 bit variables/ 99 integer variables
- Integrated 16MB flash memory
- PROFINET V2.3 (CC-C), Netload Class III, FSU, MRP
- EtherNet/IP according to CIP Edition V3.11, EIP adaption of CIP V1.12, DLR, Quick Connect
- EtherCAT I/O according to ETG.1000 V1.2, auto-increment and fixed addressing, CoE, EoE, FoE
- I/O function available in 16DIO (universal) and 8DI 8DO
- IP-rated for IP65, IP67 and IP69K



Multi-PROTOCOL



EtherNet/IP™
EtherCAT™

DCUs are IP67 I/O modules with integrated PLC functionality that connect sensors and actuators and can perform simple logical operations of more complex control systems, all without a higher-level PLC. Our modules are now universal with the new 16DIO DCU1.

Be certain.
Belden.

Your Benefits

One Device Automation Is Possible with Smart, Dynamic and Simple DCUs

The LioN-Power DCU1 brings innovation into your production lines. By making existing machines IP-ready, the DCU1 is ideal if you don't want to undergo a complete redesign to upgrade to new technologies. They're **an economical solution for field-level automation** in an IIoT environment.

Whether you have older, legacy systems (e.g., fieldbus) or are building out a new network, the DCU1 can **couple your machines to an Ethernet network per a variety of protocols** – PROFINET, EtherNet/IP or EtherCAT – and bring transparency to your operations.

This DCU also offers you the power of options – from flexible bitmapping assignments to setting input and output channels as needed. With this DCU in place, you can perform a variety of complex automation and control tasks in the field without a higher-level PLC. The device also enable fast intuitive installation and maintenance because it can retain configuration and be programmed for a **“plug-and-play-type” module exchange**.

Applications

With LioN-Power DCU modules, you can easily handle a variety of applications in the DCU operation mode: sorting pieces on a conveyor belt, performing various timer or counter functions or exchanging data with higher-level controllers.

The LioN-Power DCU1 can relieve the PLC workload. With the DCU1, you can decentralize your operations without requiring a permanent connection to the network or the PLC.

The DCU1 is especially well-suited for smaller automation applications and smaller machine builders.

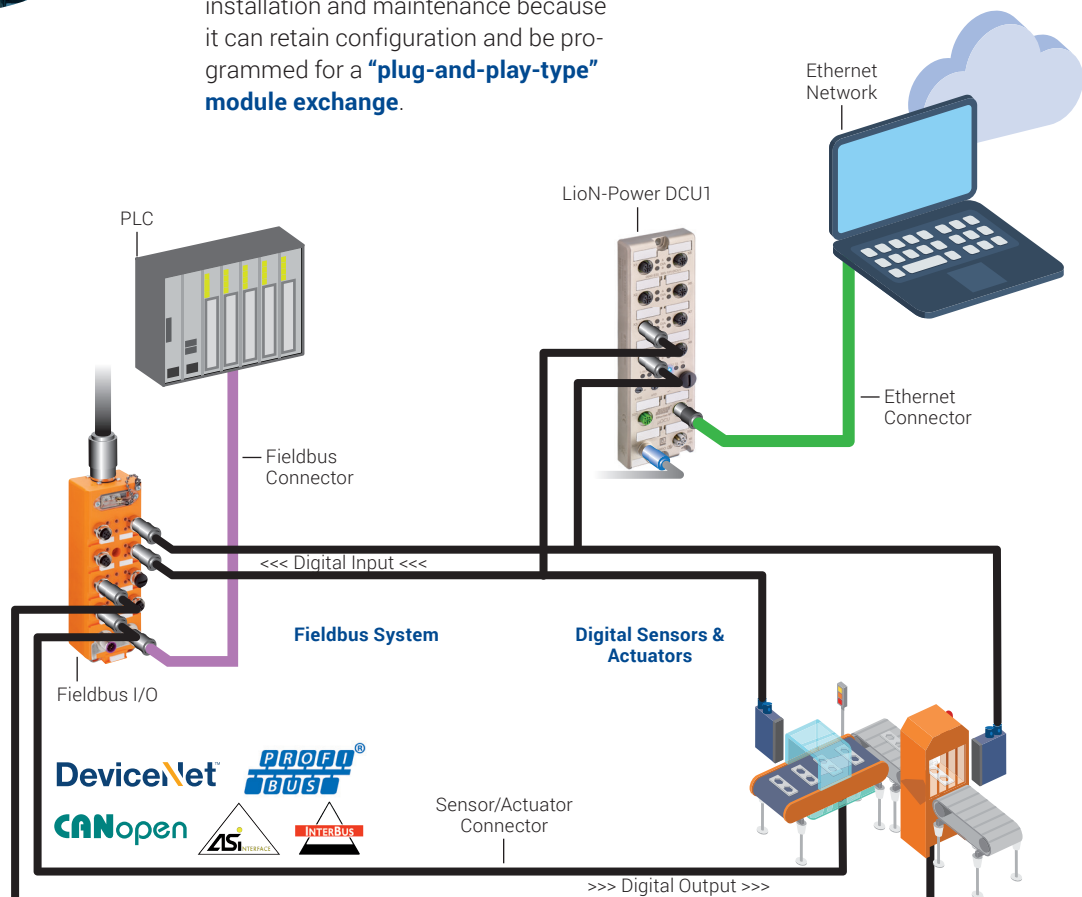
Markets

The LioN-Power DCU1 was designed to operate in harsh environments across different sectors, such as automotive or food and beverage manufacturing, material handling or packaging and transportation. It can also be used by machine builders or with robotic machinery.



Make fieldbus systems IP-ready

LioN-P DCU1 helps you handle your growing business no matter your system set-up or protocol preference. It adds transparency to your operations by transferring data between sensors and higher-level PLCs and assisting management systems in generating reports to inform business decisions.



LioN-Power DCU1 in Detail

Why a DCU?

The automation market challenges manufacturers to constantly improve efficiency. **DCUs execute communication, separate diagnostic data from process data and allow cyber-physical connections – all of which elevate the burden typically placed on the PLC.**

This approach keeps operational data from the sensors and actuators close to the affected machine part and, for security reasons, keeps intellectual property from the sub-systems within the machine itself.

DCUs can:

- Control the onboard I/Os independently from the higher-level PLC
- React to diagnostic events (short-circuit, under voltage)
- Communicate simultaneously with a connected PLC (2 bytes for bit communication, 16 bytes for integer operations)
- Share information on an industrial Ethernet network

Simple and Cost-Effective

You can program the DCU1 with the **freeware programming tool LDmicro in Ladder Logic (LAD)** without prior programming knowledge. This gives you an accelerated, cost-effective path to field-level automation. LDmicro offers instructions for:

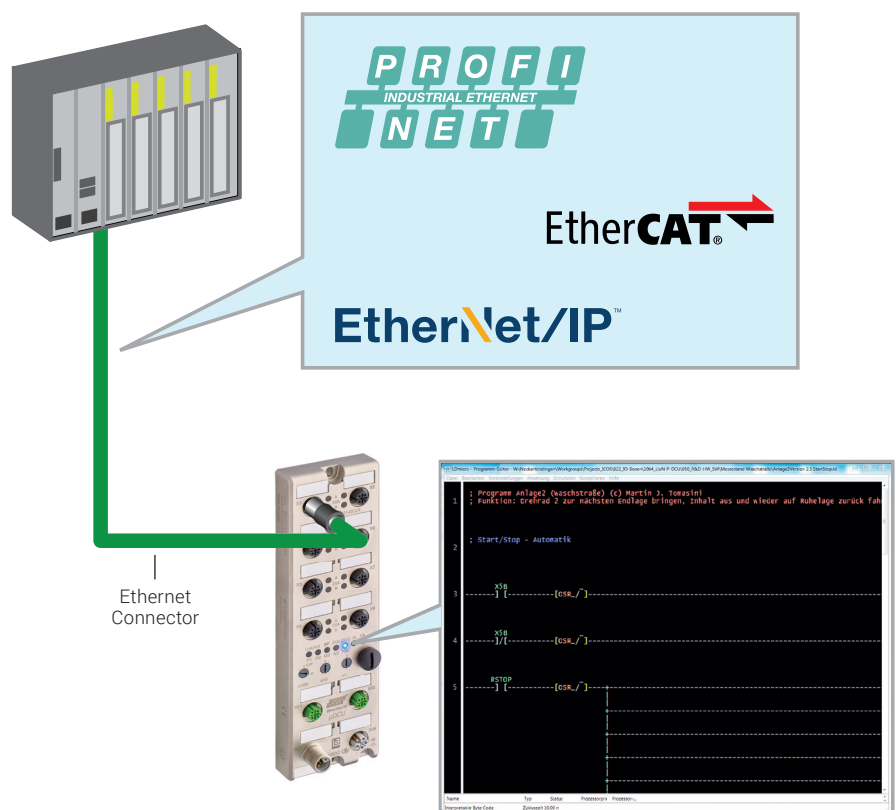
- Bit operations, such as contacts and coils, to control onboard I/Os
- Timers and counters (TON, TOF, RTO) to count from milliseconds to tens of minutes
- 16-bit signed arithmetic operations

Also, in smaller applications you no longer need a PLC, which brings added cost-savings to your business.

Flexible and Versatile

LioN-P DCU1 is a versatile product that enables manufacturers to simplify their data transmission solutions and adapt existing systems. With its multi-protocol options and integrated micro intelligence, you can tap into the world's first I/O device that supports all three of the most popular Ethernet protocols – all in one device:

- PROFINET
- EtherNet/IP
- EtherCAT

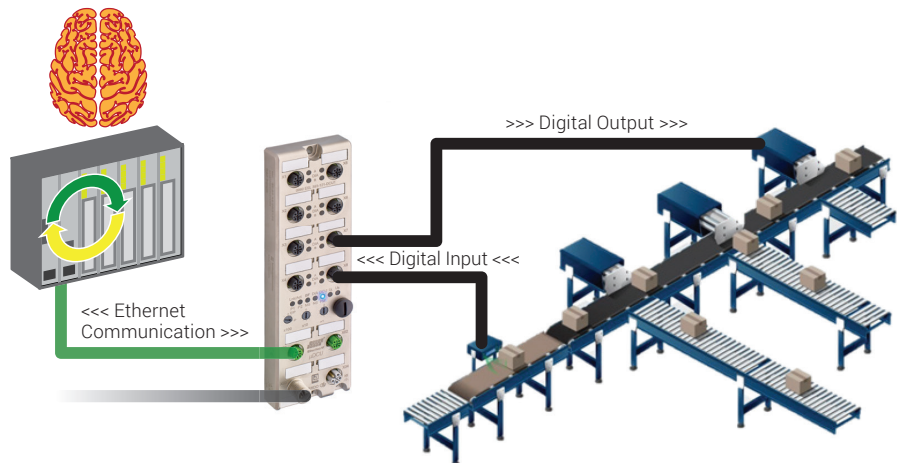


DCU1 Modes: One Application, Three Possibilities

The DCU1 can act as a slave I/O to a central PLC, as a standalone controller or in a mixed DCU mode in combination with a PLC for data exchange. This brings plant efficiency to the next level.

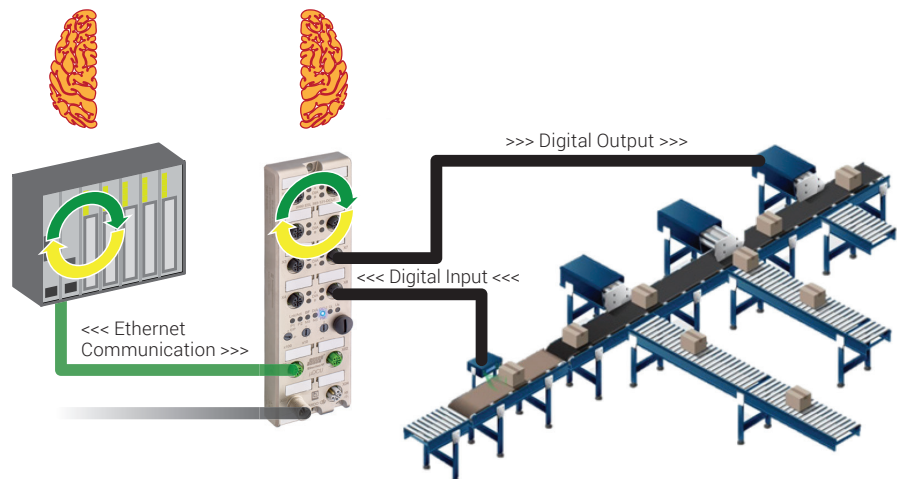
Standard I/O Slave

Typically, I/O modules always transmit input data to a controller and will only set an output if the controller tells it to. By operating in standard I/O slave mode, you don't need an application logic inside the DCU1.



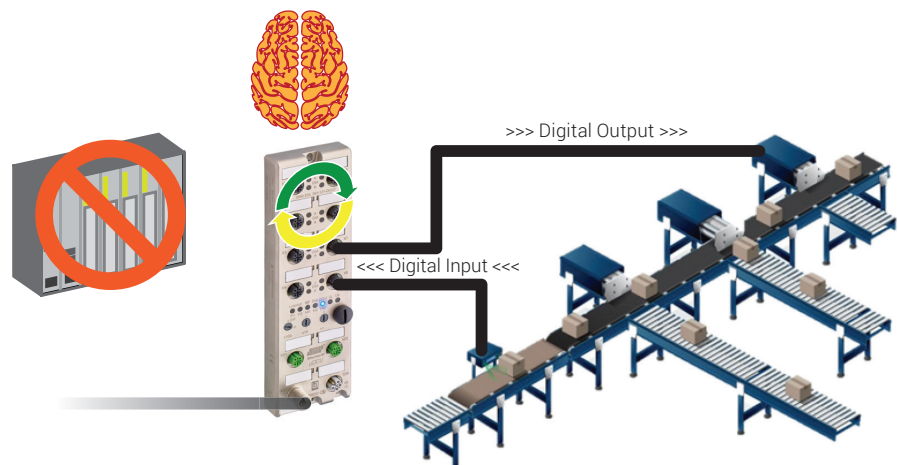
DCU/PLC Mixed Mode

For communication of the DCU1 with a PLC are 2 byte for bit communication and 16 bytes for integer operations reserved. The logic of the Application is implemented via webserver inside the DCU1 and starts, stops or transmits data to the PLC on command.



Standalone DCU

The intelligence (application logic) is inside the DCU1, therefore no I/O communication with the PLC is needed to determine what to do with the signals. It is completely independent from any engineering tool, and connection to the PLC is not necessary. This option brings you to **"one-device automation"**.



You can Run your Application in Three Simple Steps:

With LDmicro, you can create programs for the DCU1 in a ladder diagram style, according to EN61131-3.

About Ladder Logic

Originally introduced as a method for documenting design and construction of relay racks used in manufacturing and process control, Ladder Logic uses a graphical programming approach. Each relay rack displays on a screen as a rung, positioned on a ladder. The vertical rails of the ladder represent connections to the devices below.

Ladder Logic has evolved into a more robust programming language that now uses a graphical diagram based on the circuit diagrams of relay logic hardware. It is commonly used to develop software for PLCs in industrial control applications.



Lines/Rungs:

Horizontal lines are called rungs. Each rung is executed from left to right, top to bottom.



Contacts/Inputs:

Inputs and input conditions are represented as contacts [], with the "slash" / [showing as a neglected input, '0.'

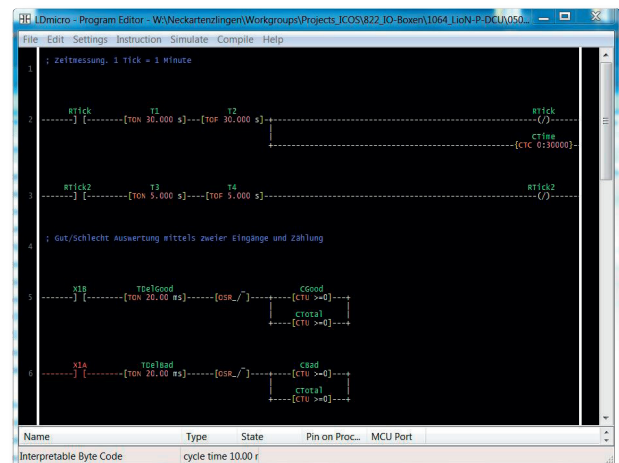


Coils/Outputs:

Outputs are represented as coils () and are always on the right side of the rung. A slash (/) inside the run resets the output to '0.'

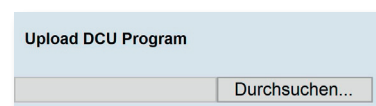
1. Program with LDmicro in Ladder Logic (LAD)

With the LDmicro tool you are able to program your application offline (without a connection to the DCU1). Simple condition and action logic keep the complexity on a low level.



2. Upload the Program

Connect your DCU1 to the Ethernet network and upload your LDmicro programm through a webserver with just two clicks.



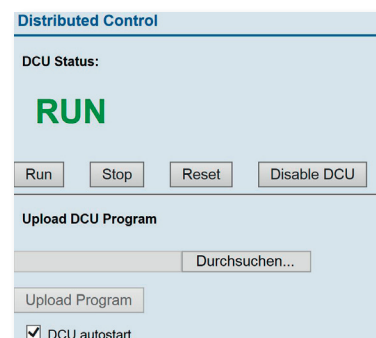
3. Start your Application

The last step to make your application operative is done after selecting your DCU1 program and clicking the Run field.



Your application logic is now implemented inside your DCU1.

Click "Run" to start your application and activate your DCU Mode.

To start the application automatically on every power cycle select the check box "DCU autostart".



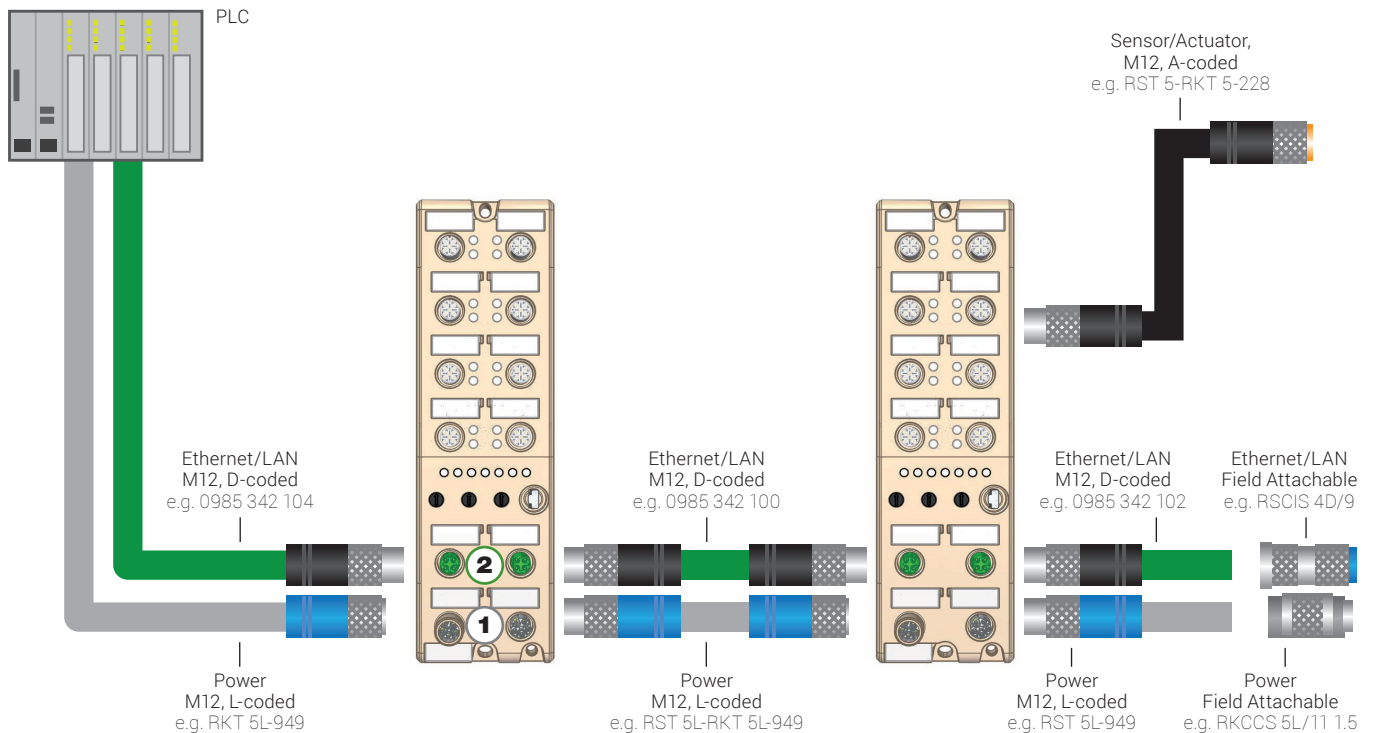
Technical Information



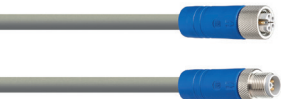




Type	8DI 8DO	16DIO
		
Order Designation	0980 ESL 393-121-DCU1	0980 ESL 390-121-DCU1
Product Description	LioN-P, Distributed Control Unit, LDmicro Programmable (Ladder), Multiprotocol (PROFINET, EtherNet/IP and EtherCAT) I/O device, industrial metal housing, 60 mm, up to IP69K, 8 digital input and 8 digital output channels (2 A) with galvanic isolation, 8 x M12 A-coded I/O connection, 5-poles, 2x M12 D-coded bus connection, 4-poles, 2 x M12 L-coded power supply connection, 5-poles	
General Data		
Housing	Zinc die-cast housing, potted	
Dimensions (W x H x D)	60 mm x 31 mm x 200 mm	
Weight	ca. 500 g	
Ambient Temperature	-20 °C to +70 °C (Operation)	
Protection Degree	IP65, IP67, IP69K*	
Schock / Vibration	50 g / 15 g	
Power Supply		
Nominal Voltage	24 V DC (18 to 30 V DC)	
Connection	2 x M12, L-coded, 5-poles, up to 2 x 16 A	
Current Consumption	typ. 120 mA (at 24 V DC)	
Control System		
Programming	Programming via LDmicro in Ladder Logic (LAD)	
Program Deployment	via Webserver/HTTP	
Processor	200 MHz RISC CPU	
Performance	DCU cycle time of avg. 10 ms	
Program Memory	max. 99 Rungs/99 Bit Variables/99 Integer Variables	
Flash Memory	16 MB	
Operation Modes	Slave I/O, Standalone DCU mode, mixed DCU/PLC mode	
Bus System		
Protocol	Multiprotocol (PROFINET, EtherNet/IP and EtherCAT)	
Connection	2 x M12, D-coded, 4-poles	
PROFINET Features	PROFINET V2.3 (CC-C), Netload Class III, FSU, MRP	
EtherNet/IP Features	EtherNet/IP acc. to CIP Edition V3.11, EIP Adaption of CIP V1.12, DLR, Quick Connect	
EtherCAT Features	EtherCAT IO acc. to ETG.1000 V1.2, auto-increment and fixed addressing, CoE, EoE, FoE	
On-Board I/O		
I/O Function	8 digital inputs and 8 digital outputs, fixed configuration	16 digital in-/outputs (DIO), universal I/O option per channel
Connection	8x M12, 5-pole, A-coded	
DI Channel Type	Type 3 acc. To IEC 61131-2, PNP (typ. 5 mA nominal input current)	
Sensor Current Supply	max. 200 mA per port	max. 500 mA per port
DO Output Current	max. 2 A per channel	
Galv. Isolated Outputs	Yes, all outputs	No
Protective Circuit	Electronically: Overload and short-circuit protection	

*only if mounted and locked and in combination with Hirschmann / Lumberg connector.

We reserve the right to make technical changes.

Connection Guide



1 Power – L-coded M12 Power, 5-poles	2 Data – D-coded M12 LAN/Ethernet, 4-poles
 <p>Male straight/Female straight RST 5L-RKT 5L-949/* M Shielded version: RSTS 5L-RKTS 5L-956/*M</p> <p>Male angled/Female angled RSWT 5L-RKWT 5L-949/* M Shielded version: RSWTS 5L-RKWTS 5L-956/*M</p>	 <p>Male straight/Male straight 0985 342 100/* M</p> <p>Male straight/Male angled 0985 342 132/* M</p> <p>Male angled/Male angled 0985 342 131/* M</p>
 <p>Male straight/Open RST 5L-949/*M Shielded version: RSTS 5L-956/*M</p> <p>Male angled/Open RSWT 5L-949/*M Shielded version: RSWTS 5L-956/*M</p> <p>Female straight/Open RKT 5L-949/*M Shielded version: RKTS 5L-956/*M</p> <p>Female angled/Open RKWT 5L-949/*M Shielded version: RKWTS 5L-956/*M</p>	 <p>Male straight/Open 0985 342 102/* M</p> <p>Male angled/Open 0985 342 102/* M</p>
 <p>Field attachable – Male straight Crimp type: RSCCS 5L/11 1.5</p> <p>Field attachable – Male angled Crimp type: RSCWCS 5L/11 1.5</p> <p>Field attachable – Female straight Crimp type: RKCCS 5L/11 1.5</p> <p>Field attachable – Female angled Crimp type: RKCWCS 5L/11 1.5</p>	 <p>Field attachable – Male Straight Clamping cage: RSCIS 4D/9 Spring type: 0986 EMC 102</p>
	 <p>Adapter – M12/RJ45 0981 ENC 100</p>

* = cable length in m (e.g. 30 cm -> 0.3 M). Standard cable lengths: 0.3 m, 0.6 m, 1 m, 2 m, 5 m, 10 m, 15 m, 20 m, 30 m.
For other cable lengths and connectors please contact icos-sales@belden.com

Order Information

Order Number	Order Designation	Bus Protocol	Housing	Width	IP	I/O	PWR Connection	Bus Connection	I/O Connection
Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), M12 Power									
934879005	0980 ESL 393-121-DCU1	Multiprotocol	Metal	60 mm	up to IP69K	8DI 8DO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934879008	0980 ESL 390-121-DCU1	Multiprotocol	Metal	60 mm	up to IP69K	16DIO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded

Belden Competence Center

As the complexity of communication and connectivity solutions has increased, so have the requirements for design, implementation and maintenance of these solutions. For users, acquiring and verifying the latest expert knowledge plays a decisive role in this. As a reliable partner for end-to-end solutions, Belden offers expert consulting, design, technical support, as well as technology and product training courses, from a single source: Belden Competence Center. In addition, we offer you the right qualification for every area of expertise through the world's first certification program for industrial networks. Up-to-date manufacturer's expertise, an international service network and access to external specialists guarantee you the best possible support for products.

Irrespective of the technology you use, you can rely on our full support – support-automation@belden.com – from implementation to optimization of every aspect of daily operations.



Always Stay Ahead with Belden

In a highly competitive environment, it is crucial to have reliable partners who add value to your business. When it comes to signal transmissions, Belden is the No. 1 solutions provider. We know your business and want to understand your specific challenges and goals to show how effective signal transmission solutions can push you ahead of the competition. By combining the strengths of our five leading brands, Belden, GarrettCom, Hirschmann, Lumberg Automation and Tofino Security, we are able to offer the integrated solution you need. Today, it may be a single cable, switch or connector, to solve a specific issue; tomorrow, it can be a complex range of integrated applications, systems and solutions. With the rise in smart, connected devices brought on by the Industrial Internet of Things (IIoT), together, we can make sure your infrastructure is ready to handle and make sense of the influx of data. Transform your business now with instant access to information, and make your vision a reality. Visit info.belden.com/iiot to learn more.

About Belden

Belden Inc., a global leader in high quality, end-to-end signal transmission solutions, delivers a comprehensive product portfolio designed to meet the mission-critical network infrastructure needs of industrial, enterprise and broadcast markets. With innovative solutions targeted at reliable and secure transmission of rapidly growing amounts of data, audio and video needed for today's applications, Belden is at the center of the global transformation to a connected world. Founded in 1902, the company is headquartered in St. Louis, USA, and has manufacturing capabilities in North and South America, Europe and Asia.

For more information, visit us at www.belden.com and follow us on Twitter [@BeldenIND](https://twitter.com/BeldenIND).